

GAVRT Antenna at Goldstone, California



Students participating in the GAVRT program use this NASA antenna to observe Jupiter at 21 cm wavelength.

The Goldstone Apple Valley Radio Telescope (GAVRT) project brings hands-on scientific discovery to the classroom.

Students use a 34-meter (110-foot) radio telescope at NASA's Deep Space Network (DSN) Goldstone Complex located in the deserts of Southern California.

Using the internet from their classrooms, students point the telescope at targets in space and record the data.

Students calibrate and "reduce" the data which is then added to the larger NASA-JPL data set monitoring Jupiter's radio emission.

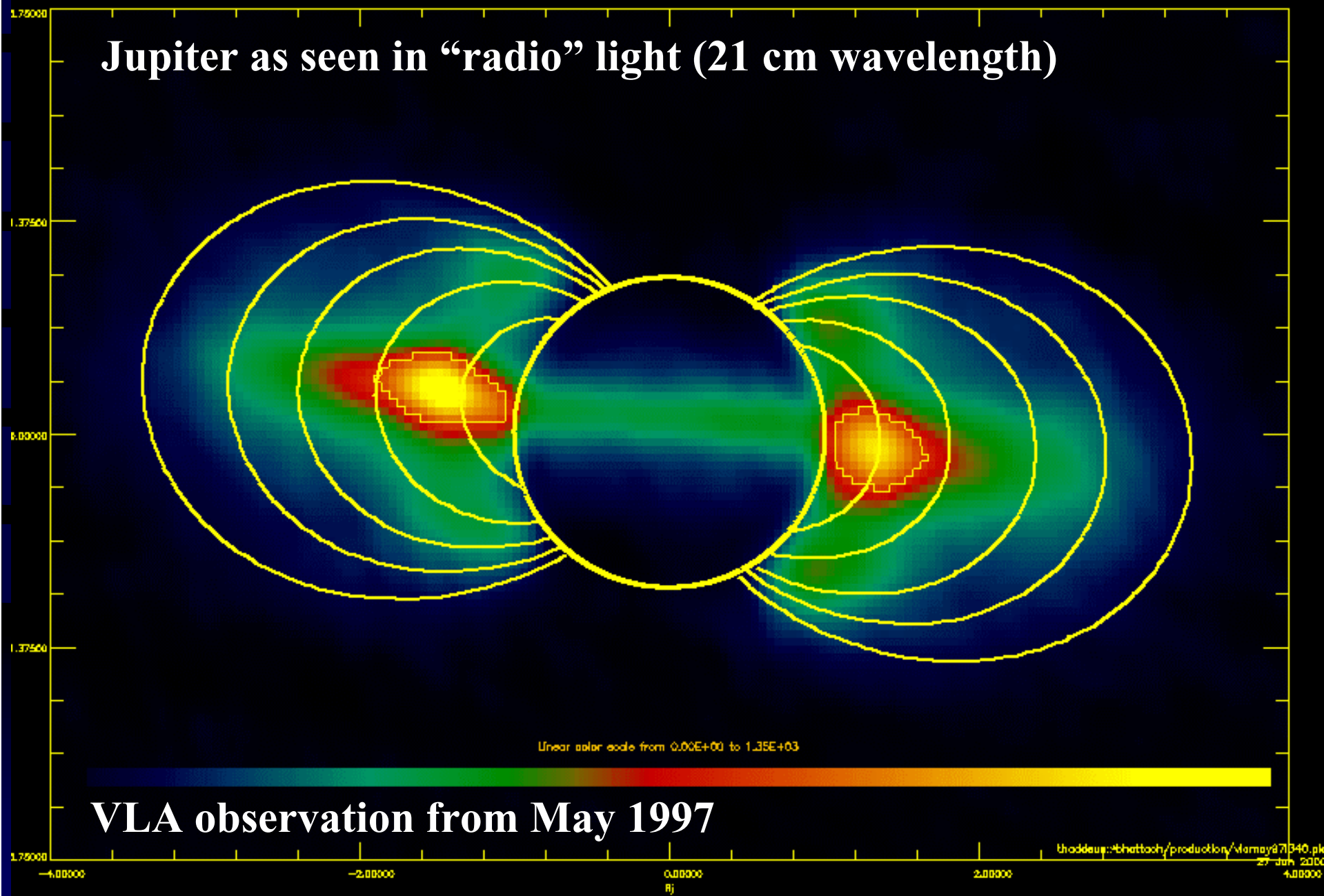
The goal of the program is to provide an opportunity for students to experience real science and learn that science is an on-going process and not just a series of facts to memorize. Students learn the basic principles of science and radio astronomy. They learn antenna operations and create detailed mission plans.

The GAVRT curriculum project, Jupiter Quest, involves students in planning a hypothetical space mission to Jupiter. They use the GAVRT telescope to measure the temperature of Jupiter's atmosphere and study variations in the radio emission from the planet's intense radiation belts.

GAVRT is an integral part of the Cassini flyby of Jupiter. The student's data will be combined with data from the Cassini spacecraft, and other Earth based radio telescopes to help scientists learn about Jupiter's radio emission and magnetosphere.

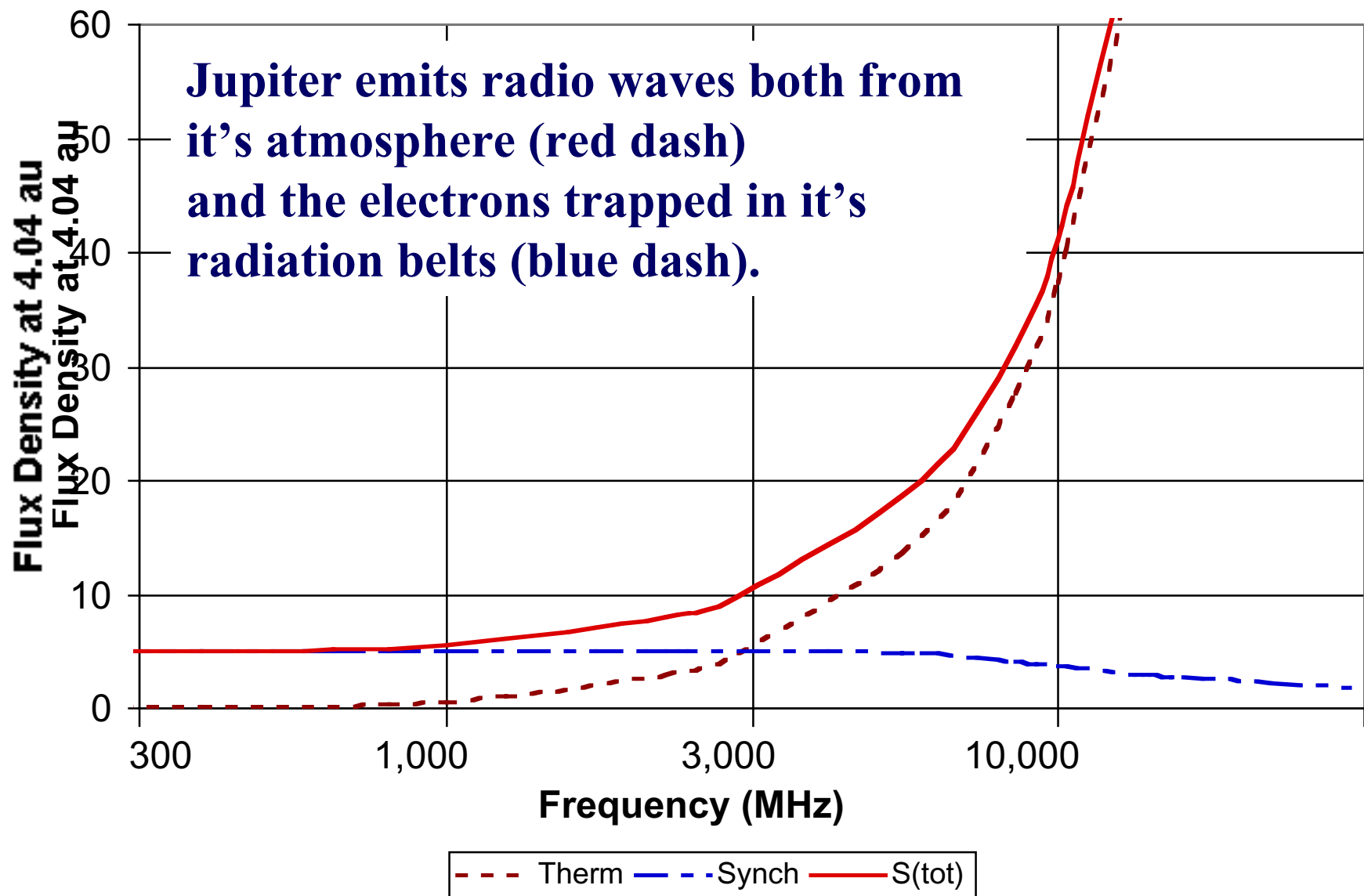
CML = 340°; Total map intensity = 1.0; $E_0 = 100 \text{ MeV}$

Jupiter as seen in “radio” light (21 cm wavelength)

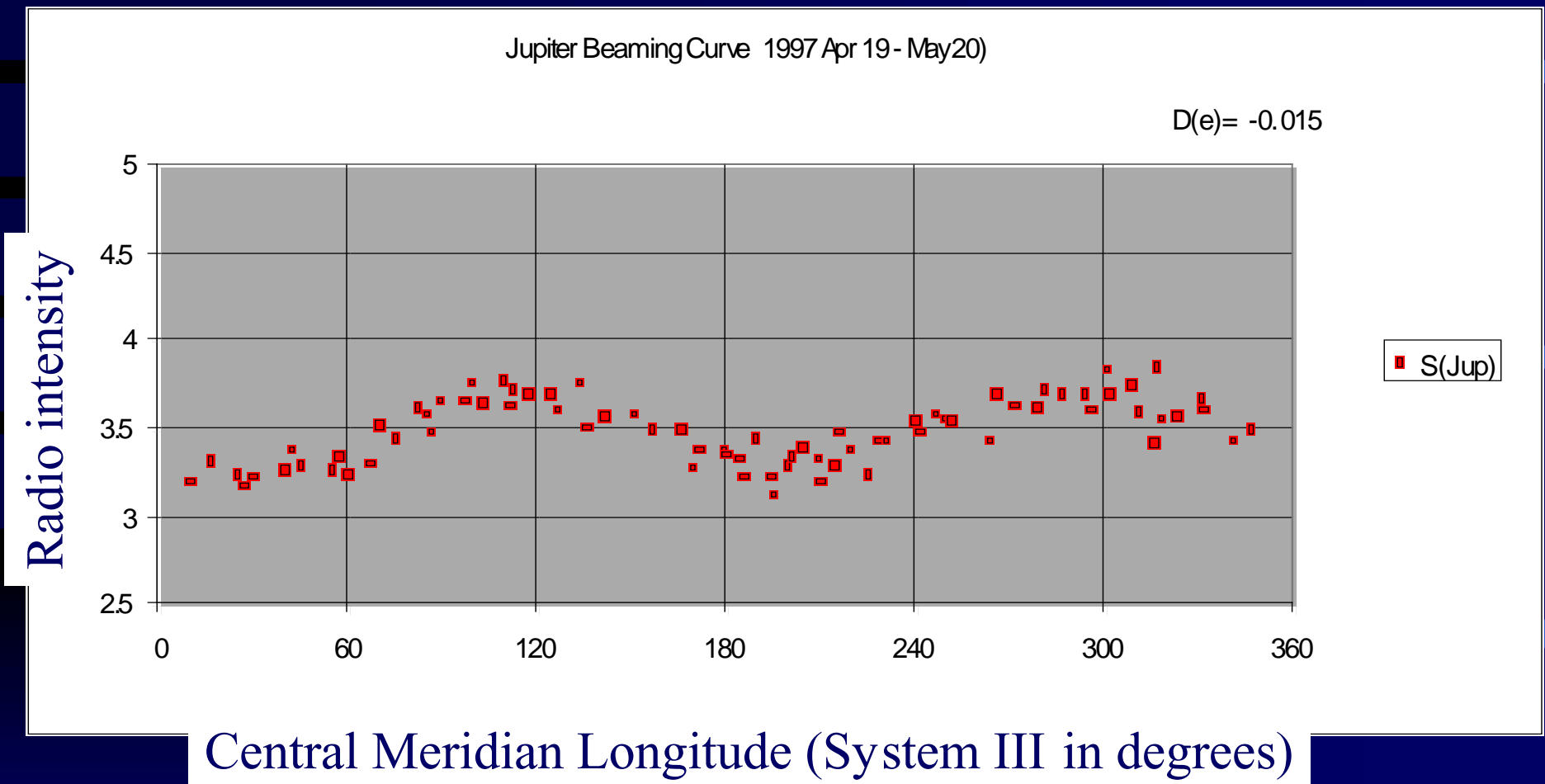


The Very Large Array (VLA) in New Mexico uses 27 radio antennas (an interferometer) to create radio maps of Jupiter.





As observed from the Earth, the radio emission from Jupiter's radiation belts varies about 10% as Jupiter spins on its axis (about 10 hours is one Jupiter day). These are actual data points from a NASA antenna.



Time history of the daily peak intensity of Jupiter's synchrotron emission (at 21 cm radio wavelength). Red dots are from NASA's Deep Space Network antennas. Earlier data are from various observational programs.

